THE Chemist

MARCH, 1947 VOLUME XXIV, No. 3

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The Chemist

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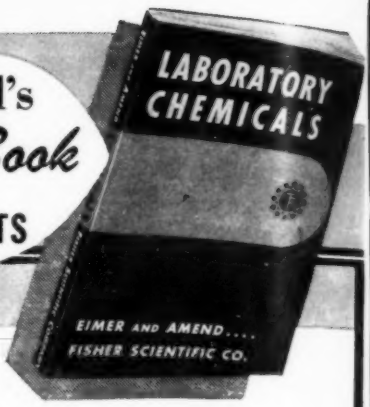

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Opinions Expressed on the Proposed Coalition of the A. I. C. and the A. C. S.

Dr. Foster D. Snell

President, The American Institute of Chemists

AS of the first thirty days after mailing, there were 1367 ballots returned. Of these, 1171 voted in favor of the coalition and 188 were opposed, with eight ballots returned without vote. Of the pro vote, about thirty seven per cent included some comment. Of the opposing votes, approximately sixty per cent included comment. The comments, pro or con, have been reproduced, with certain probable translations of those showing maximum illegibility, and distributed to the Council of the INSTITUTE.

The maximum attention has been devoted to those ballots opposing the plan to see wherein the membership differed from the unanimous opinion of your council — which unanimity was not cited in my letter of January sixth, to avoid unduly influencing those who were balloting. In each case of a signed ballot, where there appeared to be misunderstanding, I have written a personal reply, a not inconsiderable task. Insofar as letters were unsigned, any reply can only be made through these columns.

Before turning to a consideration of the criticisms raised, your Council wants to express its appreciation for the time and trouble taken by the membership in sending comments. The expressions of approval give us reason to believe that our lengthy considerations of detail have not been time wasted.

To avoid confusion of terminology, the word "Institute" so used here, means our group, whether operating as THE AMERICAN INSTITUTE OF CHEMISTS or as the INSTITUTE OF THE AMERICAN CHEMICAL SOCIETY. This term is used to stress the separate entity of the INSTITUTE whether inside or outside the portals of the American Chemical Society. One must not overlook the fact that we shall retain that entity in either case.

Your INSTITUTE will continue to have a spring meeting entirely separate from the meetings of the American Chemical Society. For the present at least, it will continue to publish THE CHEMIST as its journal. Several alternative publication plans have been discussed without persuasion that they will offer a real advantage. The objectives are to reach

a much larger number of readers.

To refer to the balloting again, it may have been an error to ask members to return ballots, if possible, by February first. That was an addition made to the ballot at the last minute in order to avoid ballots straggling in over too long a time. It was not a deadline. The ballot was an opinion poll. It did not of itself commit the INSTITUTE to anything. There seems to be no question that a great majority of the membership favor such a move with proper safeguards. Your INSTITUTE is a republic in which such an action would be carried out by the Council at the instruction of the majority of the electorate.

Two general and contradictory criticisms occur time and time again in the comments. The first is that the plan should have been presented to the membership at an earlier and less definitely formulated stage. The second is that some details were not completed when the plan was announced and that until every point was settled, even somewhat minor ones, the plan was not suitable for approval. Those two groups of critics, not numerically very large, may be considered to have answered each other.

Another group of critics is that which says the INSTITUTE is being gobbled up and will lose its identity. It should not, and if the INSTITUTE provides itself with the proper officers, it will not lose its identity. Rather, it will (1) have its own standard of membership; (2) operate from its own offices (3) by its own officers. It will be the voice of the profession of chemistry, the only one. This criticism seems to be a matter of opinion.

There is another group who simply comments that the plan will not work. About the only answer is that, if it does not, we could withdraw as a unit and again become independent.

A limited number visualize the INSTITUTE as an employees' organization and the American Chemical Society as an employers' organization. More consideration will show that the employed chemist who chooses one organization, and only one, is in the American Chemical Society and not in the INSTITUTE. We can reach that group through coalition.

A few express the opinion that the INSTITUTE must accept as a member anyone in good standing in The American Chemical Society. Legal opinion is otherwise. Any American Chemical Society member will be welcome as an associate but only those meeting our standards, which are being raised, can become members as defined in the plan.

A considerable number express regret that the title of Fellow is not being retained. I join with them in that regret. After the arrangement has been completed and put into working order, I urge that the ad-

vocates of that repeat the request in the form of an amendment to our by-laws; I pledge my support to their effort.

The question of operation as a democracy is raised by some. We are a republic, not a democracy. The electorate choose representatives who in turn vote for them. Both the American Chemical Society and the INSTITUTE operate as republics.

The matter of dues comes up inevitably. We hope to increase membership so largely as to cut dues. The first must precede the second.

In some cases where objections were raised, it was either because of our failure to supply sufficient detail (if the letter had been too long only a few would have read it) or a lack of clarity of presentation. The latter must be assumed when the facts on which the criticism is made are counter to statements in the original letter.

On the whole, the comments received represented considered opinions and they are duly appreciated.

Exchange of Scientific Personnel Between Australia and The United States

(Reprinted from the *Melbourne University Gazette,* Oct. 31, 1946)

A copy of a memorandum to the Secretary, Department of External Affairs, from the Australian Scientific Research Liaison Office, Washington, has recently come to hand. It states that the "Fulbright Bill" passed by the 79th Congress of the United States provides for the retenion in foreign countries, including Australia, of some funds due under Lend-Lease. The funds are now to be expended, in the currency of the foreign country concerned, in providing land, buildings and other services; and the remainder is to be used for financing courses abroad for American students, to sponsor the visits of American professors to overseas institutions for lecturing purposes, and to permit the visits of scientists from the Government and probably private research institutions such as the Mellon Institute, the Battelle Memorial Institute, the Smithsonian Institution, the Carnegie Institute, etc., to other countries.

. . . Australia's residue . . . is $5,000,000 to be expended for the abovementioned purposes and for the general encouragement of cultural interchanges.

A ten-man Board of Foreign Scholarships is to be set up by the State Department to select persons coming under this agreement, and to administer the program. It is considered that the type of persons who could be invited to Australia should include physicists, biologists, lecturers in chemical engineering fundamentals, etc., as well as technologists from Government agencies in such fields as synthetic fuels, protein chemistry, etc. In addition, it is

suggested that the visit of one or more senior librarians would facilitate the strengthening of the Australian Library system.

The Educational Congress of the Frozen Food Institute will be held March 31-April 4, 1947, at the Copley Plaza Hotel, in Boston, Mass. Among the authorities who will conduct the classes during the convention are Dr. Herman W. Dorn, F.A.I.C., supervisor of biochemistry, Process and Product Research Division, Owen - Illinois Glass Company, Toledo, Ohio, and Mr. Herman C. Lythgoe, F.A.I.C., immediate past director of the Food and Drug Division of the Massachusetts Department of Public Health.

Dr. E. L. Luaces, F.A.I.C., chairman of the Public Affairs Subcommittee of the Ohio Chemists Committee on Professional Practice (Ohio C_2P_2) took part in the symposium, "Licensing and National Certification," held December third at the University of Syracuse under the auspices of the Syracuse Section of the American Chemical Society.

On January 17th, Dr. Luaces argued the affirmative in a debate sponsored by the Milwaukee Section of the American Chemical Society on "Resolved, that for the protection of the profession and the public, chemists engaged in serving the public in general should be subject to legal registration and qualification."

Research and Management

Dr. Gustav Egloff, F.A.I.C.

Universal Oil Products Company, Chicago, Illinois

THERE was a time when all management had to be sold on the value of research to business. In the last two decades, the attitude of management has broadened, though there are still many companies where a more receptive attitude toward research needs to be developed. In general, industrial management needs more understanding of the nature and types of research and its value to business. There are also research men who lack an understanding of the problems of industry and there are many researchers who need to have a better understanding of the woes of management. A man in charge of a business has a variety of responsibilities that are not always appreciated by the technical employee. Research and management do not always meet on common ground, though there are many cases of a satisfactory standing, particularly where technically trained men are a part of management.

Research conducted in universities is usually of a fundamental character seldom concerned with time limits or the necessity for making profits. Government research is somewhat similar, though usually more applied than fundamental. Nonprofit research foundations carry on fundamental and applied research for small and large industrial concerns. Industrial research is primarily concerned with making money, and it may involve both fundamental and applied research. The problems between management and research personnel in universities, government departments, and foundations are possibly not as acute as those frequently encountered in industry, and therefore, this paper will deal with research from the industrial standpoint.

Fundamentally, research is an orderly, thorough, systematic examination and gathering of facts relating to any subject. It is perhaps difficult to improve on a dictionary definition which says that research is:

> "Studious inquiry or examination; specific and usually critical and exhaustive investigation or experimentation having for its aim the discovery of new facts and their correct interpretation, the revision of accepted conclusions, theories, or laws, in the light of newly discovered facts, or the practical applica-

tions of such new or revised conclusions."

This concept of research should be emphasized in any attempt to convince management of its potential value. Research is applicable to many phases of business activity, as well as to problems in material science using chemical, physical, and engineering methods, and data. A scientific researcher in any field first scrutinizes all available information on a given topic and forms whatever conclusions are warranted from the data at hand. Having exhausted all available information, he arrives at a point where he decides that it is too hazardous to reach further conclusions by strictly inferential and inductive reasoning. Experimentation is necessary, if further accurate knowledge is to be gained. At this point, in the case of statistical surveys, more information may be sought through the medium of questionnaires, surveys, and polls. In the case of material research in the natural sciences, a series of experiments are planned and conducted to determine the effect of various factors on a problem. Under the scientific procedure, factors are determined under rigidly controlled conditions and a positive basis is gained for further deductions.

In real research, therefore, the initial stage involves an exhaustive survey of all available records to accumulate the published data, which are then classified, evaluated, and correlated. When experimentally determined facts are obtained, the cycle is repeated and the new data are fitted into the known portions of the field under investigation.

Sometimes a thorough literature survey may solve a problem without any experimental work. At the other extreme, the preliminary study of facts pertaining to the problem may immediately indicate that little is known about it and experiments must be started, if the problem is to be solved. It is a common experience that in many research projects more time is spent in the library than in the laboratory.

Research and management must understand each other's language, if a proper relationship is to be attained. The experimenter who is engaged to solve some industrial problem should bear in mind that the ultimate objective of his work is to make money for the company. Management should realize that the results of experimental work cannot be accurately forecast and that the researcher must often explore blind alleys before he arrives at the solution of a problem. Due to these essential differences, research and management may talk and act at cross purposes and develop modes of expression reciprocally misunderstood. Such a situation is comparable to the Tower of Babel where the confusion of tongues caused a complete work stoppage. Industry frequently suffers through lack of

understanding of research, and correspondingly, a research department may fail to achieve its objectives, because of a lack of understanding of business methods, which are principally concerned with profit and loss. Research workers feel that they should be taken more into the confidence of management and told of the implications and importance of their work. Research and management actually complement each other and each should have the other's complete confidence and appreciation of the other's difficulties. In this sense, research is really a part of management and there should be no lack of harmony between them.

There are so many fields in industry to which the research method can be profitably applied that it may be well to recount some of them, since management does not always realize that the scientific method can be applied to practically any problem.

What may be called statistical research, for want of a better name, may be applied to systems of accounting and record keeping; to marketing surveys; to sales data, including the effects of advertising methods; to the analysis of economic conditions and the forecasting of trends, and to the accumulation and digestion of trade information, particularly in regard to the processes and products of competitors. Such research can be done most effectively by those thoroughly grounded in the scientific method so that they can evaluate data and make recommendations without favor or prejudice.

The research method may also be applied to the organizational and personnel problems which continually confront industrial management. Management is beginning to recognize problems of personalities and special capabilities for the purpose of placing employees in types of work for which they are best suited. The effect upon morale and individual efficiency of having everyone as satisfied as possible with his job is not always appreciated.

Help is needed in any business to keep current scientific and industrial information filed and classified so that a continuous record is kept of developments among competing organizations. Such technical personnel should be chosen for their ability to analyze statistics and to supplement published economic and business information. This type of research is an insurance that a company will be able to meet competition from other manufacturers supplying the same field. If frequent surveys are made of the quality and composition of competitors' products, valuable information will be gained which may call for the modification of the company's operations.

In production control, the research method can be applied with far-reaching benefits. Analytical and test methods must be constantly applied

to samples taken along the line of operations in a plant. These methods must be well-developed and accurate, if control is to be assured so that products conform to specifications. It may be necessary to devise new methods. The development of test methods can be left to scientifically trained personnel who are well versed in the branches of science relating to the particular field of industrial operation needing control. As a result of fundamental research work in the last two decades, many new tools are available for use in research.

Research is needed to improve old processes by increasing their efficiency of operation. It is indeed seldom that the original operation of a process is the best. By assigning a research group to the study of plant operation, marked improvements are always achieved. As a corollary to the study of existing processes, new processes are deveoped which frequently supersede the older operations. Improved processes often result from the systematic tabulation and correlation of factory data over a considerable period of time, during which thousands of routine tests and analyses of intermediate and final products are conducted. As a rule, only men thoroughly trained and conversant with the scientific method can maintain complete long-time records and analyze them to form bases for improvements.

Research is needed, not only to improve the quality and to lower the production cost of established products, but also to develop new products. There is no static condition in an industry; if it does not advance, it declines. To maintain public interest in its products, it should continually present to the consumer something new or better.

Management needs research personnel to provide contacts with other industries which may supply information of value. There is a feeling of common interest among research workers in different industries, and data are frequently exchanged, either verbally or in writing, which are of benefit to industries apparently quite unrelated. Many valuable scientific data, which are useful to a company, are presented before meetings of technical and scientific societies.

Scientific personnel are necessary to advise management on current problems. One research authority states that advising management really consumes one-hundred per cent of his time. This statement is probably overdrawn, but even the most far-reaching and apparently impractical research frequently gives results which influence management's decisions. Business situations are constantly changing. If the research department is taken into the confidence of management, it can give both current and longe-range advice of great value.

A company needs a research de-

partment to evaluate properly its processes and products and to secure patent protection for its inventions. This is necessary, particularly for small companies, although frequently their management does not sufficiently recognize the importance of patent protection.

A number of the larger industrial corporations maintain well-organized patent departments, composed for the most part of scientifically trained men, many of whom have had actual plant experience. The combination of scientific and legal training in the same man is the best assurance that a business can have that it will secure adequate patent protection for its new developments. Only a small percentage of companies is patent conscious. *Thomas' Register,* for 1944, lists about 25,000 manufacturers, of whom more than 1,700 are capitalized at over $10,000,000; more than 5,000 at over $1,000,000, and over 10,000 at over $100,000. A more recent survey showed that only 166, or less than one per cent of those listed, showed any patent activity, and only twenty-five per cent of these pursued a vigorous patent policy. This indicates a more or less hand-to-mouth existence from a technical point of view in the majority of corporations.

The research division may include one technical man or hundreds. It has been recommended that a business should spend two per cent of its gross receipts on research work. Others believe that expenditures should be related to profits and that from five to fifty per cent should be spent on research. An old established institution may keep up with commercial developments by an expenditure of five per cent, while a younger company seeking to establish itself in a market may well expend up to fifty per cent or more of its profits.

A small business, which cannot afford extensive laboratory experimentation, will profit by employing at least one good technical man, even if he merely follows current technical information. In handling current problems, such an employee may be a contact man where consulting laboratories are used, or where problems are placed with industrial foundations or institutes. Many industries represented by relatively small, independent units have organized Cooperative Trade Association laboratories which conduct research on common problems. The technologists in each company keep track of experiments conducted in these laboratories and evaluate the data obtained for their companies' needs. A larger corporation may start with a small laboratory and develop it into one equipped to conduct research. A still larger business may profitably support an extensive and complex research organization, as many of them do. Such large businesses also support many fellowships in industrial research institutes and

apply the results of such research to further their business projects.

It must be admitted that a great deal of research has a large element of speculation in it, though no company has ever lost on intelligently managed research. In this respect, research differs strikingly from other divisions of an industry. Compared to accounting, production, and sales, research is sometimes unpredictable and quite erratic in its results. This is an inherent property of research and it should be recognized by both the researcher and management. However, it may be safely said that in well-regulated research there is much less speculation than in the average business. Research cannot guarantee the solution of all problems. In many cases, its results may appear to be negative, but even these are of value in showing many things that are either impractical or impossible under the economic set-up existing at the time the research is conducted. Management should learn that one of the most generally used phrases in a research department is, "We don't know," which in a sense justifies the existence of the research department. There should be close contact at all times between research and sales departments, and management should see that each maintains a cooperative attitude toward the other.

Possibly, management which includes no scientifically trained men has the greatest difficulty in understanding the aims, objectives, and possibilities of "material research," or research in the chemical and physical sciences. Here the researcher may find it a real task to convince management that experimental work to improve processes and products will pay dividends. The most difficulty in obtaining backing for research projects will be encountered in the case of longe-range problems, particularly if no immediate predictions can be made about the time required before results can be shown.

Patience is necessary in evaluating the benefits of research to business. In general, it is poor policy to impose too many restrictions and controls on a research department. While the effects of research on some problems may be quickly seen, many years may be required to obtain the solution to a major problem. A great deal of judgment is necessary to decide when a research project should be continued or dropped. Here the interim results of research may have to be sold to management to get funds for further development. Many important problems have not been solved because research was stopped short of their solution. If Universal Oil Products Company had stopped at an expenditure of $5,000,000, the company would have ceased to exist. They spent over $6,000,000 in research and development on the cracking process to produce gasoline before the investment began to be profitable. The lack

of understanding of the time required for chemical research is exemplified by an incident in which a plant superintendent brought an unknown sample to the laboratory for analysis and evaluation. He informed the chemist in charge that he wanted to get the results "right away." As he left the laboratory, he heard someone say, "I wonder what laundry that fellow runs." The executive was chagrined at the time but later told the story on himself.

For many decades, most research in science was carried out at universities under the guidance of professors who were little concerned with the practical applications of the results of their work. Such research involved the determination of fundamental facts and the exploration of uncharted fields. The entry of the research chemist or engineer into industrial work started at the turn of the century and has been increasing as an exponential function since 1920. The first business men to employ university graduates for research work regarded it as more or less of a gamble, but most now recognize that the help of research men is essential to the proper conduct and progress of their business. One executive, in the early days of the petroleum refining industry, classified the chemist as a necessary evil. He couldn't get along with him, and he couldn't get along without him. The company he represented has since gone extensively into both fundamental and applied research, which shows a complete reversal of policy.

The General Electric Corporation is an outstanding example of one which fosters long-term creative research. In fact, industrial research in the United States may be said to have begun in 1900 with Dr. Willis R. Whitney of this corporation, who began his work on a very modest scale. Since then many workers in this company have attacked fundamental problems and have been allowed to follow whatever course they desired, even though it frequently seemed to deviate widely from the original objective. The results of work done by such men as Steinmetz, Coolidge, and Langmuir reflect credit on this policy.

From modest beginnings in 1900, the total expenditures for industrial research in the United States have risen to fantastic proportions. In 1920, $29,000,000 was spent by three hundred industrial concerns employing 9,300 persons in research work. In 1940, $234,000,000 was spent for research in 2,350 laboratories employing over 70,000 research personnel. In twenty years, therefore, there was more than a seven-fold growth in the number of people employed in industrial research. However, of over 17,000 manufacturing concerns reporting from $500,000 to $1,000,000 in gross sales in 1940, only 2,300 or 13.5 per cent reported any research

activity. This indicates a rather complacent attitude by many corporations and a lack of appreciation for the value of research by others. Research has changed from a so-called luxury to a necessity, if a company is to keep abreast of the times and meet inevitable competition. As an indication of trends in industrial research, an authority estimates that by 1950 as high as ten per cent of petroleum refinery personnel will be engaged in research projects. If the increase in research personnel in other industries follows this proportion, it is questionable whether enough scientifically trained research workers will be available to fill the jobs created. A recent charging of research expenditures by years indicates that research will continue to grow at a rapid rate. According to the chart, industrial research in 1946 will account for the expenditure of $500,000,000. The petroleum industry is planning to spend one-hundred per cent more for research postwar than was spent prewar. The war provided a great stimulus to applied research not only in industry but in government. In January, 1945, government expenditures for research were at the rate of $600,000,000 a year.

The benefits of research must be sold principally to small and medium sized businesses. Most of the large progressive industries maintain well-staffed and equipped research organizations. The problem there is to convince management of the direction which research should take and the fields in which experimental work should be conducted. This calls for a careful analysis of commercial trends. A small business is in reality a young, potential big-business organization. Fifteen major industries of the United States have been developed as a result of researches conducted since 1880. All the leading corporations in the industrial fields started out on a small scale. Recently, research has been responsible for the establishment of several entirely new industries. Examples are DDT, and a soil fumigant which is rendering enormous agricultural areas productive. A prominent consulting research organization reports that its clients are largely among corporations capitalized at from $1,000,000 to more than $10,000,000. Only twenty per cent of its clients are small companies, and they yield less than five per cent of the current income of the organization.

Among the larger corporations, steel, coal, railroad, milling, and textile industries lag behind in research in contrast to aviation, petroleum, chemicals, plastics, glass, and electrical manufacturing companies. The steel industry is feeling increased competition from materials developed by research, such as special alloys, magnesium, and laminated wood. The soap industry has been invaded by many synthetic detergents made from petroleum sul-

fonates. Synthetic dyestuffs have almost completely superseded natural products. In order to combat the increasing use of oil-fueled Diesel engines in railroad locomotives, the coal industry is sponsoring extensive experimentation on the use of powdered coal in gas turbines to be used for powering locomotives. The textile industry is competing with synthetic products such as nylon and glass. Under competitve pressure, many of the corporations formerly laggard in research have recently instituted long-range research programs.

An argument in favor of research for any manufacturing organization is that it invariably results in the production of diversified products. Variations in market demands due to economic changes do not so greatly affect a company which has a progressive research department. Several examples may be cited. An old, established paper manufacturing company was selling seventy per cent of its product as book paper for magazines; twenty per cent for coating, and ten per cent for wallpaper stock. During the depression of 1929 and in the years following, with lessened demand for their main products, their plant's production capacity was down to thirty per cent. To stimulate business, salesmen were instructed to search out particular paper problems. It was found that a large soap manufacturer needed an alkali-proof wrapping paper. The research organization of the company was able to produce a satisfactory paper and increase its sales in this field, even against the competition of larger paper companies.

In another case, a large company was quarrying stone for use principally in monuments and as building material. This company had one research man. During the depression its operations fell to about fifteen per cent of capacity. A consulting research organization was called in to suggest modifications in their operations to increase production. In a few months, a new material was developed from marble which was extensively marketed for use in churches, store fronts, theatre ticket booths, and other decorative applications. Research was done on the orientation of the stone, and improved cutting techniques gave better light transmission to the stone and developed new, artistic effects. Cutting costs were reduced, and the use of the stone in prefabricated housing was also developed.

A recent questionnaire circulated among the stockholders of a company requested information as to what they wanted to be included in corporation reports. Among the items specified, the state of research projects occupied fourth place on the list. The investing public is conscious of the value of research in maintaining the stability of a corporation. It is now the policy of many banks to give preferential

treatment in the matter of business loans to corporations having well-managed research departments. Investment brokers also take into consideration the amount and quality of research that a corporation conducts. A research organization is looked upon as a fundamental asset.

The modern world is geared to the results of scientific research and development. One has only to mention penicillin, streptomycin, and other antibiotics, various types of serums, insecticides, weed killers, aviation fuels, and a host of mechanical products to show that the life of the average person has been immeasurably enriched by the products of research. Continued emphasis on the need for more and better consumer items will lead to the better satisfaction of human desires for improvement of mental, physical, economic, and social well-being. The health of the individual is being constantly improved so that he will live longer and get more out of life.

The dissolution of I. F. Laucks, Inc., Seattle, Washington, into Monsanto Chemical Company's Western Division, does not affect Laucks Laboratories, Inc., which is a separate organization. Officers of Laucks Laboratories are Mr. Laucks, president; John M. Kniseley, F.A.I.C., vice president; and Francis P. Owens, secretary-treasurer.

The sixth international Congress of Experimental Cytology will meet in Stockholm, July 10-17, 1947. The Swedish organization committee has planned a series of symposia on the following subjects: (A) Chemical constituents of the cell. (B) Submicroscopic structure of the protoplasm (including viruses). (C) Nuclear and cytoplasmic interactions. (D) Cell metabolism. (E) Development, growth, and differentiation. Information may be obtained from Secretaries Professor T. Caspersson and Docent H. Hyden, Karolinska Institutet, Inst. for Cell Research, Stockholm, Sweden.

British Chemical Exposition

The Chemical Society (London) will hold its first chemical exposition, featuring achievements of British chemistry, during the July centenary celebration. The exhibition will be divided into two sections. The first will feature a history of the advancements made in chemistry during the one-hundred years of the Society's existence. The second part will feature modern products.

Edmund R. Bullock, F.A.I.C., has retired from the Eastman Kodak Company. He is engaged in preparing a monograph on a subject in photographic chemistry, and is also available as consultant. His address is now 42 Werner Park, Rochester 7, New York.

Dr. M. L. Crossley

Dr. Harry L. Fisher, F.A.I.C.

Director of Organic Research, U. S. Industrial Chemicals, Inc.

The Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS has been awarded to Dr. M. L. Crossley, a director of research of the American Cyanamid Company at the Calco Chemical Division and at Stamford. The presentation will be made at the Annual Meeting of the INSTITUTE, May 2, 1947, at the Hotel Commodore, New York, N. Y. The award is made for his scientific work and leadership in research in the fields of dyes and pharmaceuticals and for his activities in behalf of the profession of Chemist.

Dr. Crossley was born July 3, 1884, of American parents at Saba Island, Dutch West Indies, where his father, an engineer, had gone to develop a sulfur mine. He was educated at Brown University where he was awarded the degrees of Ph.B., 1909, M.S., 1910, and Ph.D. 1911. He began his very active scientific life at his own university as instructor in chemistry during his two graduate years. During the following two years he was associate professor at William Jewell College, then lecturer in organic chemistry at Wesleyan University (Connecticut), 1913-14, and associate professor and acting head of the department, 1914-18, Like many other university teachers, near the end of World War I, he left university work, but continued in his chosen field of organic chemistry, by becoming chief chemist of Calco Chemical Company. Eighteen years later he became director of research, and in 1941, director of research of the American Cyanamid Company at Calco and Stamford. He, therefore, has been in the same company for almost thirty years—a long and enviable record.

His early interest in dyes is shown by the preparation, in the first year after receiving his doctor's degree, of a paper on "Improved Method for the Production of Mono-B-aminoanthraquinone," which was presented at the meeting of the Eighth International Congress of Applied Chemistry, New York, 1912. He and I became acquainted at that meeting and we both were thrilled at seeing and listening to such wonderful organic chemists as the great camphor chemists, the Finnish Komppa, the English Forster, and the American W. A.

Noyes, Sr.; the English dye chemist, A. G. Green; the Danish E. Biilmann who worked with the quinhydrone electrode; the Czech carbohydrate chemist, E. Votocek; A. Skita, already well known for his work on catalytic hydrogenation; Eric Clemmensen, who proposed his method of reduction with zinc amalgam and hydrochloric acid; the Germans, Raschig and Duisberg, who exhibited the Kaiser's synthetic rubber tires; the English W. H. Perkin, Jr., who told of his work on synthetic rubber and was vehemently attacked by Duisberg; and our own E. C. Franklin, S. P. Mulligan, C. H. Herty, T. B. Johnson, A. J. Hill, and J. M. Nelson. Marston T. Bogert presided superbly at the four full days of organic section meetings, and many years later (1936) Dr. Crossley had the honor of presenting him with the Gold Medal of the INSTITUTE. What a list of famous organic names and what an opportunity! The inspiration of these four full days left its mark!

Then began a long active career in the study of dyes, their preparation and manufacture, their constitution and the relation of their constitution to color. In these early studies, he became interested in the use and action of dyes on bacteria and their applications in medicine. This interest became intense and has been the subject of his most important publications. Quinoline derivatives, the great field of sulfanilamides, magnesium salts, the synergistic action of drugs, all occupied his attention with much success. He holds many patents in both these fields.

Although deeply engaged in scientific work and the management of a research laboratory, he found time to work on problems connected with the professional side of the chemist. He was especially interested in the education of the chemist, and as early as 1920 we find him saying, "It is not the function of an educational institution to produce expert professional men, but rather to train men to think and to orient themselves advantageously in their environment. To qualify as an industrial chemist, a man's training must be augmented by experience gained in the chemical industry . . . An academic degree should be an endorsement of a man's character as well as an affidavit of the amount of training he has had." The idea of sound training in sound institutions of learning, together with the development of good character, for all of which he worked so diligently and valiantly, early became a crusade with him.

In his presidential address at the meeting of the INSTITUTE in Baltimore, 1925, he emphasized the educational training of chemists as well as a proper code of ethics. As chairman of the Committee on Professional Education, he pushed his program of minimum requirements of a broad outline of courses and had the satis-

faction of seeing it endorsed by many educators throughout the country. This program later was taken on, enlarged, and generally accepted through the efforts of the officers of the American Chemical Society.

Besides the educational requirements and a code of ethics, he also worked on methods of influencing the economic status of the profession; helped to bring about greater compensation in some instances, and also studied the economic basis for the amortization of the service investment of the chemist, as well as problems in the licensing of chemists. He was instrumental in establishing a bureau of appointments where "the individual obtains the position which he is best qualified to fill, regardless of whether he is employed." Futhermore, he contributed much toward a proper definition of a chemist.

Dr. Crossley is a charter member of the INSTITUTE, was president for two terms, 1924-26 and 1934-36, and was councilor for several years. He has also been very active in the affairs of the American Chemical Society.

His work as a citizen has not gone unnoticed. In 1940 he was awarded the Brown Bear by Brown University for outstanding achievements, the award being inscribed with the following quotation from the University Charter of 1764, "Duly qualified for discharging the offices of life with usefulness and reputation." Brown also conferred upon him the honorary degree of doctor of science in 1944.

He has traveled extensively, in this country and abroad. Besides attending the Eighth International Congress in New York in 1912, he was a delegate to the International Union of Pure and Applied Science in Washington, 1926, to the Ninth International Congress of Chemistry in Madrid, 1934, and to the Tenth International Congress in Rome, 1938. He also was in Europe immediately after the late war.

He has contributed many scientific and professional papers to scientific industrial and trade journals, has done considerable lecturing, and at present is associate editor of *Archives of Biochemistry*.

Dr. Crossley cites writing as one of his hobbies and sailing as the other. His grandfather on his mother's side was a sea captain and he is an expert sailor himself. Whenever possible he hies to his summer place in Martha's Vineyard and sails and sails and sails.

His sterling character, soundness of purpose, and thought for others are shown in all that he undertakes, and are mirrored in his writings: "When we become satisfied with our creations and refuse to change them we are ready for the undertaker."

"The past accomplishments of the chemist are but a prelude to what is expected of him in the future."

"The mental habit of curiosity must be cultivated and disciplined to be of value in seeking truth. Simply

being curious to know leads nowhere. It must be accompanied by a strong determination to find out and by unlimited reserves of energy to follow the trail to the end without faltering."

"To believe in any cause, we must know it thoroughly. To convince others of its worth, we must be sure of it ourselves."

Toch Educational Fund

The Chemists' Club, 52 East 41st Street, New York, N. Y. has created the Toch Educational Fund, in memory of Dr. Maximilian Toch. The fund is derived from subscriptions from members of the Club who knew him. The chairman of the Committee in charge of the Fund is William Callan, F.A.I.C. The late Dr. Toch was an honorary member of the Chemists' Club and also of THE AMERICAN INSTITUTE OF CHEMISTS.

The President's Conference on Fire Prevention will be held May 6-8th in the Departmental Auditorium, Federal Works Building, Washington 25, D. C. More than 2,000 delegates are expected to attend, representing Federal departments, State, county, and municipal governments, and business organizations. Plans will be made for more education in methods of fire prevention and control, adequate laws and more rigid enforcement, and better engineering to make buildings fire resistant.

If I Could Renew My Education

Other Letters On This Subject
Appeared In The February CHEMIST

COULD I project myself back to college days again, I would take as many courses as I could possibly get in the humanities. I would take all the English literature I could crowd into the course. I would be eager to get as much philosophy, psychology, social science, and economics as possible. I would also place great emphasis on extra curricular activities.

I cannot recall at present any courses that I took that were of no value to me. Of course, I did not expect to have to take everything offered in the Biology Department in order to be able to answer the question I asked, which was, "how can I know as much about myself as I would want to know about my automobile?" I took several courses in educational psychology and pedagogy. They were extremely valuable to me in giving me an appreciation of the responsibility of a good teacher to prepare himself for understanding his students.

I am sure that a broad, liberal training is the best foundation for the chemical profession. It would be better for the chemist if he took more courses in the humanities and fewer specialized courses in chemistry. The undergraduate courses should do two things—they should stimulate interest in the field which one wishes to enter and they should prepare the individual to be a good citizen. To be a good citizen is first of all to be able to develop a proper sense of individual moral responsibility for conditions as they are in the world about us and a desire to help to improve them. To think wisely, one must be able to evaluate experiences from a broad point of view, and this can not be accomplished by highly specialized education. One may take all the courses offered in chemistry and related sciences and yet be illiterate. The future of the chemical profession will be measured largely in terms of the capacity of chemists to understand the significances of discoveries in chemistry and not only by their possession of a large assortment of facts.

—*M. L. Crossley*
Director of Research
American Cyanamid Company

GENERALLY speaking, I have been fairly well satisfied with the scope, usefulness and character of the subject material which I was

able to get in college as an undergraduate and a graduate student. Admittedly, time did not permit the inclusion of many courses closely allied to my field of interest. However, at the time of my collegiate work, mass production in the educational field had not reached its present proportions and the individual had an opportunity of general guidance designed to stimulate reflection and appraisal of the value of course work and activities which would lead toward his main objective. I believe that this situation developed resourcefulness, versatility, and that it accelerated maturity of judgment concerning the value and utility of technical knowledge and technics in their application to a particular problem.

During the past several years I have come in contact with many chemistry and technology graduates, and their immaturity of judgment, and failure to detect and apply obvious elements of knowledge to a given situation seems to have reflected less comprehension than seemed to prevail among graduates of equivalent training several years ago.

—Dr. G. C. Supplee, Director
G. C. Supplee Research Corporation
Bainbridge, N. Y.

From Our Readers

To the Editor:

The February issue of THE CHEMIST was most stimulating.

The matter of university curricula is of especial significance at present. While the courses required are, in general, adequate, and possibly more, their "timing" often diminishes their impact and utility. Thus, the student usually manages to complete his mathematics requirements at the end of his second year. Usually, during the fourth year, he begins the study of thermodynamics, an extremely powerful tool in competent hands. Unfortunately, by this time differential calculus has been relegated to the past, and our student has to restudy mathematics while attempting to keep up with thermodynamics. It does not work out too well, and thermodynamics is damned as useless.

Many new graduates are rather weak in their command of the English language. A course in "report writing" is advocated in the senior year. A semester course in "contemporary culture", including the arts and the social impact of the sciences, is recommended during the senior year, by which time the student should have been able to formulate certain opinions of his own.

"Industrial chemistry" is also suggested; the first semester in the classroom, while the second should devote one full day in actual work in an industrial laboratory or plant

suitable to the university and the young scholar.

"Employment opportunities" is urged most vehemently. Most of our new graduates are woefully lost when faced with the actual mechanics of finding a suitable position. This is undesirable and unnecessary, and the advice of an able employment counselor can often save much heartbreak and disillusionment. Fully as important as getting a job is keeping it. That, too, should be discussed.

Below is a suggested four-year curriculum for a major in chemistry. It is a heavy, rather rigid, program, but should bring forth an efficient, qualified chemist. Provision is open in the senior year for election of specialized courses in chemistry and for undergraduate research.

1.

General Chemistry
Mechanics
Literature Survey
Solid Geometry
German

2.

Qualitative Inorganic Analysis
Composition
Electricity and Magnetism
Trigonometry
German

3.

Qualitative Inorganic Analysis
Light and Sound
American History
Coordinate Geometry
Differential Calculus
Biology
Russian

4.

Quantitative Inorganic Analysis including gas analysis
Organic Chemistry
European History
Differential Calculus
Biology
Russian

5.

Quantitative Inorganic Analysis including Instrumentation
Organic Chemistry
Integral Calculus
Logic and Scientific Method
Glass Blowing
History of Chemistry

6.

Quantitative Organic Analysis
Heat
Integral Calculus
Physical Chemistry
Industrial Chemistry (Classroom)

7.

Qualitative Organic Analysis
Differential Equations
Report Writing
Industrial Chemistry (Plant)
Modern Inorganic Chemistry

8.

Modern Physics
Vector Analysis
Employment Opportunities
Thermodynamics
Contemporary Culture

Leaving the curriculum and turning to the supply of chemists, I am most strongly in favor of controlling the quality, and thus the supply—and for a selfish reason. I have a singularly jealous regard for the profession of the chemist, and I dislike intensely to have anyone who chooses to do so to call himself a "Chemist". To me, the solution is rather simple.

Upon graduation from an A.C.S. accredited university, the aspirant shall submit to the chemistry faculty of his school his qualifications and record. If these are satisfactory, he shall be granted, in addition to the baccalaureate degree, the right to employ the appendage "Accredited". (B.S. Accredited). After five years of work in industry or graduate school or both, the candidate shall tender to the "Committee on Professional Relations" of the A.C.S. his record at school and in industry. If these meet rigid standards, he shall have the privilege of using the adjunct "Qualified". (B.S. Qualified). No compulsion shall be exercised in these matters, but the candidate would undoubtedly find it most desirable to obtain the professional degree, and the employer (after suitable publicity) would probably choose a qualified man in preference to one lacking professional sanction. The chemical profession would undoubtedly gain, since, ultimately, incompetents lacking indorsement would be forced to discontinue the practice of chemistry.

—Frank Kipnis, F.A.I.C.

To the Editor:

It was a pleasure to read the fine symposium regarding the question "Should the Supply of Chemists be Regulated?" which appeared in the February number of our journal. The point was made there that in a sense the matter is one of academic interest.

Is the supply of chemists regulated? Surely it is—just as the supply of butchers, and bakers, and candlestick makers is regulated. There is a powerful force, known as the law of supply and demand, which in the long run tends to strike a remarkably suitable balance between the qualifications, duties and responsibilities of a trade or profession and, on the other hand, the rewards, material and otherwise, associated with it. I say that this law of supply and demand operates in our profession just as it does in all other callings.

Why then does this matter of the supply of chemists arise so frequently and why is it the subject of peculiarly sharp and insistent controversy? The answer is that there is in our profession a powerful force which operates counter to the natural law of supply and demand. Here is an example:

There are many students who every year apply for admission to medical and dental schools and who are not accepted. They find their chosen careers cut short and they are in a dilemma. What to do?

It becomes necessary for them to

choose some other calling, and when they review their qualifications, they soon discover that in preparation for their would-be profession, they have taken numerous courses in chemistry. The solution to their problem seems clear, they will find laboratory jobs and thus become professional men—chemists.

I know that the number of young men who find themselves compelled to make this choice is very considerable and the same thing occurs year after year.

Now these men who choose or rather adopt the profession of chemistry are, on the whole, persons of fine character and integrity and they are not without ability. The question then arises, what is wrong with this stream of recruits to our calling.

There is this fatal defect—that the love and enthusiasm for the profession are not there. Rather have they been replaced by feelings of deep disappointment, chagrin, and resentment. Therein lie the seeds of disintegration and decay of any profession. The members are not true chemists—they simply took the next best thing. It was a matter of expediency, no love, no enthusiasm, no real desire, just simply expediency.

Does this state of affairs produce a situation which calls for and demands the licensing of chemists? I certainly believe it does. The science of chemistry and the profession of chemist must face this matter and act with courage.

—Louis Marshall, F.A.I.C.

Recommended for Professional Reading

A bibliography on the professional and economic advancement of chemists, prepared from American Chemical Society publications since January 1, 1945, appears in *The Chemical Bulletin* (A.C.S. Chicago Section) for November, 1946.

"Wage Structure — Industrial Chemicals," 1946. One of a series of industry wage surveys made by the Bureau of Labor. Covers plant workers and operators in 400 establishments. U. S. Department of Labor, Bureau of Labor Statistics, Washington, D. .C

"The Decision to Use the Atomic Bomb." Henry L. Stimson, former Secretary of War. Who made the decision, and why. Article in *Harper's Magazine*. February 1947.

"The International Control of Atomic Energy." The scientific information which was transmitted to the United Nations Atomic Energy Commission. Contains a recent bibliography on atomic energy and nuclear physics. $0.30 per copy from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

" 'Middle-of-the-Road' Licensing Favored by Chemists' Institute," by Dr. Foster D. Snell, president, A.I.C., in *American Paint Journal,* Convention Daily, Nov. 8, 1946. "Further, the issue is somewhat clarified by suggestion of a 'middle of the road' position in which there would be permissive licensing."

"A Generation of Industrial Peace" by Stuart Chase, in *The Lamp,* Vol. 28, No. 5, house organ of The Standard Oil Company (New Jersey), 30 Rockefeller Plaza, New York 20, N. Y. A study of labor relations in the Standard Oil Company (New Jersey).

"The Use of Research by Professional Associations in Determining Program and Policy" 40 pp. $0.25. Russell Sage Foundation, 130 E. 22nd Street, New York, N. Y.

Dr. Gustav Egloff, F.A.I.C., recommends:

"Licensing of Lawyers", by Miles Henniger in *The Amalgamator,* published by the Milwaukee Section, American Chemical Society, Box 1575, Milwaukee, Wisconsin. October, 1946. "The licensing of the legal profession has resulted in raising the general quality of legal practitioners . . . Unauthorized practice of law is controlled and the public no longer suffers from the bad advice of persons assuming the title of 'lawyer' without meeting the requirements set up for admission to the bar and without conforming to the code of ethics required of lawyers." The author recommends the article by Hanft and Hamrick in 17 North Carolina Law Review 1 (1938), for a comprehensive study of licensing.

"The Philosophy of Professional Licensure." By Justin Miller, Dean, School of Law, Duke University. From *The Amalgamator,* Box 1575, Milwaukee, Wisconsin. "The important question is, whether those of us in whose hands now rests the destiny of the professions, are really interested in the underlying philosophy of licensure, and willing to establish the necessary procedures for properly determining by adequate training and selection, those who are to follow us."

"The Engineer as a Citizen." By Judge D. A. Simmons. *Bulletin* of the American Institute of Chemical Engineers, May 15, 1946. "You (scientists) must take a lead in explaining to the citizenship the problems of the modern age . . . We must rely upon the educated classes, the good people, the wise people . . . for the leadership of our nation."

"Enforcement of Tennessee Registration Law." By William H. Sears, in *The Illinois Engineer,* Nov. 1946. The problems encountered by the Tennessee State Board of Architectural Engineers and Examiners.

COUNCIL

OFFICERS

President, Foster D. Snell — *Secretary,* Lloyd Van Doren
Vice-president, Joseph Mattiello — *Treasurer,* Frederick A. Hessel
Honorary Secretary, Howard S. Neiman

COUNCILORS

Stuart R. Brinkley	Raymond E. Kirk	Norman A. Shepard
Gustav Egloff	Frank O. Lundstrom	W. D. Turner
Harry L. Fisher	Donald Price	James R. Withrow
Donald B. Keyes		John H. Yoe

CHAPTER REPRESENTATIVES

New York	*Niagara*	*Pennsylvania*
L. H. Flett	James Ogilvie	J. M. McIlvain
Washington	*Chicago*	*Miami Valley*
Eduard Farber	Martin DeSimo	E. L. Luaces
Baltimore	*Los Angeles*	*Louisiana*
Maurice Siegel	Raymond J. Abernethy	Harold A. Levey
Northern Ohio	*Western Pennsylvania*	*New Jersey*
M. J. Bahnsen	L. V. Clark	H. E. Riley

January Meeting

The 233rd meeting of the National Council was held January 21, 1947, at The Chemists' Club, New York, N. Y., with Dr. Foster D. Snell, president, presiding. The following officers and councilors were present: S. R. Brinkley, L. V. Clark, L. H. Flett, F. A. Hessel, D. B. Keyes, R. E. Kirk, J. Mattiello, J. M. McIlvain, H. S. Neiman, H. E. Riley, N. A. Shepard, F. D. Snell, W. D. Turner, and L. Van Doren. V. F. Kimball was present.

The minutes of the previous council meeting were accepted as circularized. The report of the treasurer

was accepted and ordered placed on file.

Upon motion made, seconded, and carried, the following resolution was unanimously adopted:

WHEREAS, in the recent death of Dr. Robert J. Moore, THE AMERICAN INSTITUTE OF CHEMISTS has sustained the loss of a Charter Member, past president, and honored member of the Council for a number of years, and

WHEREAS, Dr. Moore worked actively in the promotion of the objectives of THE AMERICAN INSTITUTE OF CHEMISTS; and

WHEREAS, in teaching the precepts of chemistry and in long and extensive association with scientific organizations and universities, he has aided the progress of the chemical profession; and

WHEREAS, through an intimate knowledge of the coatings and plastic industries, he has prepared numerous publications and delivered many addresses which have added materially to the technical information in these fields; and

WHEREAS, his cooperation, engaging personality, and support of good fellowship have endeared him to a host of fellow members and friends;

BE IT THEREFORE RESOLVED, that the Council of THE AMERICAN INSTITUTE OF CHEMISTS hereby records its deep sorrow and sense of loss sustained in the death of this distinguished technologist, leader in chemical and technical organizations, and loyal friend; and

BE IT FURTHER RESOLVED, that this resolution be spread upon the minutes of this meeting and that a copy thereof be sent, together with our most sincere sympathy, to the widow and family of our late member.

The following new members were elected:

Fellows

Goedrich, Paul
Research Fellow. N. J. College of Pharmacy, Rutgers University, New Brunswick, N. J.

Juredine, Gordon M.
Sales Engineer, Harshaw Chemical Company, 1945 E. 97th Street, Cleveland 6, Ohio.

Neumeier, Franz M.
Head of Research Laboratories, McKesson & Robbins, Inc., Bridgeport 9, Conn.

Pallace, James J.
Assistant Professor of Chemistry, Canisius College, 2001 Main St., Buffalo 8, N. Y.

Member

Silkes, Bernard
Associate Chemist in Research Division, Titanium Alloy Manufacturing Company, Niagara Falls, N. Y.

Raised from Member to Fellow

Kell, Robert W.
Head, Vinyl Division, Devoe & Raynolds Company, Louisville, Kentucky.

Reinstated As Fellow

Diefenbach, William T.
Senior Research Chemist, International Printing Ink Co., New York, N. Y.

Reinstated As Associate

Darbey, Albert
Textile and Analytical Chemist, Alrose Chemical Company, Providence, R. I.

Dr. Turner reported progress for the Committee on Ethics and a case under the Committee's consideration was referred to the next meeting of the Council.

Dr. Snell reported that he had met with Mr. Emery on January 9th to discuss further details of the proposed coalition. Concerning the local chapters of the AIC, Dr. Snell stated that the local ACS Section in Pittsburgh is operated in a manner which would best utilize the services of the local chapters of the AIC. In the Pittsburgh area, the members of the various divisions of the ACS hold meetings as they may desire. Within that pattern, it is clear that the Institute would have its own group and it would be invited by the members of the ACS Section to arrange programs for special meetings. Mr. Emery will take up with the Chairmen of the ACS Sections, in areas where there are AIC Chapters, this question of working out a cooperative arrangement between the two groups. To a great extent it depends upon the individuals in the local groups to arrange cooperatively the matter of holding meetings.

Dr. Snell stated that the ACS has no desire to dominate the work of the Institute, and that we can work independently if we want to. Financial arrangements concerning the holding of meetings in local areas will be made with the local sections of the ACS or with the governing body of the Institute of the ACS. The Institute offices will be maintained separately. The membership of the Institute may be expected to increase considerably as other ACS members interested in professional status join it.

Dr. Snell stressed the fact that achievements along professional lines are dependent upon the earnestness and activities of those who comprise the Institute of the ACS. There is only one limitation on the Institute; it may pass no resolutions on a National matter on which it speaks for the Institute of the ACS, until these have first been approved by the Board of the ACS. However, resolutions approved by a majority vote of the Institute would represent such agreement among chemists as to, presumably, merit a similar agree-

ment of the Board passing upon them.

Mr. Flett, a member of the Committee to prepare the by-laws for the proposed Institute of the ACS, presented several matters on which the Committee wanted to have the comments of the Council.

(1) Provisions for financing of local chapters. It was suggested that this be done by action of the Council.

(2) The time, place and program for the Annual Meeting. The ACS Annual Meeting will be the Annual Meeting of the Institute of the ACS. The Spring Meeting of the Institute, now corresponding to our Annual Meeting, shall be called the Medal Meeting of the Institute, at which our medal shall be awarded.

(3) How are the nominations for officers to be made? At present, the president, vice president, secretary and chairmen of the local chapters constitute the nominating committee. Attention was called to the present by-laws of the Institute where, in Article X, Section 1, nominations are made by voting members of the Institute. A nominating committee might perform a useful function in selecting those who were qualified from a large list of nominations.

(4) Dues. It was suggested that the present dues be retained at the present time, except that, in order to bring the fiscal year of the Institute into line with the fiscal year of the ACS, bills for dues be sent out this May to cover the period May 1, 1947 to January 1, 1948.

(5) The proposed by-laws should be in final form not later than March 1, 1947, for approval and presentation to the ACS at its meeting in April.

The disposition of Life Members of the Institute was considered. With the exception of but few, Life Members of the Institute are also members of the ACS, and would therefor become Life Members of the Institute of the ACS. Further consideration will be given to those few who are not ACS members.

The title "Institute of the American Chemical Society" was discussed at length, and the present time it was thought best to agree on this name.

Dr. Snell offered to prepare a letter of reply to each member of the Institute who sent in a signed comment.

The president appointed Dr. Joseph Mattiello as Chairman of the Committee on Arrangements for the Annual Meeting with the privilege of appointing other members of this Committee.

Speakers who have accepted the invitation to speak at the Medal Award Dinner are Dr. A. J. Hill, Director of Chemistry, Yale University and Dr. Henry M. Wriston, President of Brown University.

There being no further business, adjournment was taken.

CHAPTERS

Chicago

Chairman, C. A. Johnson
Vice-Chairman, F. B. Burns
Sec-treas., Mary L. Alexander
2970 N. Sheridan Street
Chicago, Ill.
Council Rep., Martin de Simo
Reporter to THE CHEMIST,
Madge M. Spiegler

On January 20th, the Chicago Chapter called an emergency meeting for the express purpose of giving its members an opportunity to discuss openly the proposed merger with the American Chemical Society and to learn a little more about the actual proposal.

The following resolution was directed to the National Council:

"It is the consensus of the group that the proposed affiliation with the American Chemical Society is desirable. The details of this affiliation to be worked out by the officers of THE AMERICAN INSTITUTE OF CHEMISTS and the American Chemical Society."

The majority of the members favored the merger because, (1) It would offer more opportunity to reach a much greater number. (2) It would eliminate duplication of effort. (3) By eliminating competition, it would engender teamwork in getting something done professionally for the chemist.

Louisiana

Chairman, J. David Reid
Vice-chairman, William H. King
Secretary-treasurer, H. A. Schuyten
Pittsburgh Testing Laboratory
816 Howard Avenue,
New Orleans, Louisiana
Council Rep., Harold A. Levey
Reporter to THE CHEMIST,
Helen Robinson

The Louisiana Chapter held a special meeting on January 15th to consider the proposed coalition of the INSTITUTE with the American Chemical Society. Many factors affecting the coalition were considered, including the name, officers, freedom of speech, membership, and dissolution. Copies of the discussion were sent to all Chapters of the INSTITUTE and to the National Council. The Chapter called attention to the fact that the A.I.C. and the A.C.S are not competitors but simply divided parts of the same brotherhood of chemists, that practically all members of the A.I.C. are members of the A.C.S. and that a union of forces such as proposed is greatly to be desired. For the greatest good to all chemists, it is desirable that the present A.I.C. be backed by the large and representative membership of the A.C.S. and that the A.C.S. be given a strong Institute Division of its more active professional members who will be able to

work for certain aims without involving too deeply those chemists who are opposed to such aims or who desire to keep the A.C.S. a strictly scientific society. A resolution approving the proposed coalition in principle, subject to final arrangements, was passed.

Miami Valley

Chairman, E. W. Fasig
Vice-chairman, G. F. Garnatz
Secretary, Eugene R. Ewell
The Lowe Brothers Company
436 East Third Street
Dayton, Ohio
Treasurer, Jacqueline Front
Council Rep., E. W. Fasig

The Chapter met December sixth, jointly with the local American Chemical Society section, and the University of Chicago Alumni Club, at the Engineers' Club in Dayton.

Dr. Anton J. Carlson, F.A.I.C., emeritus professor of the University of Chicago, spoke on "The Science of Biology and the Future of Man." He stressed the necessity of the application of the scientific method of objective observation to the problems facing the human race. More realistic education is needed in our colleges. Lawyers and statesmen should be exposed to the scientific method as preparation for modern life. It is time for the scientist to step out of the ivory tower and attempt adult education. Our civilization will vanish even as did the Greek and Roman civilizations, unless the public is educated in the scientific method. A broader base in society can give us the only hope for the future. One of the contemporary faults of mankind is the tendency to place all importance on the present and to disregard the future. This lack of thinking ahead is evidenced in strip mining—destroying soil that has taken centuries to become fertile. From our overproduction of the soil and careless disposal of the unused product, minerals are lost and not replenished. Sewage wastes and industrial poisoning destroy life in our streams. Industrial medicine is the coming field of tomorrow because of the man-made changes in our environment. Coal tar has been shown experimentally to produce cancer, yet asphalt is spread over our roads without thought of danger to life from inhalation. One of the questions which can be answered by scientists is how to feed the increased populations of the world, particularly as medical science continues to prolong and preserve life.

New Jersey

Chairman, G. L. Royer

Vice-chairman, Paul Allen, Jr.

Secretary, Harry Burrell

Burrell and Neidig
115 Broadway, New York 6, N. Y.

Treasurer, John B. Rust

Council Representative, H. E. Riley

The Chapter met in Newark, New Jersey, on December 9th, jointly with the North Jersey Section of The America Chemical Society. Dr. Foster D. Snell, president, A.I.C. spoke on "Chemistry—a Profession." The second speaker was Mr. Alden H. Emery, national secretary of the American Chemical Society who gave a preview of "What's Ahead for The American Chemical Society."

A profession, Dr. Snell said, has these salient characteristics: (1) Its activities are mental rather than physical; (2) It requires high qualifications only attained through a relatively long period of training; (3) It is predominantly a matter of advice and service to others; (4) The qualifications of its practitioners are certified by some government agency; and (5) Most important, the ethics of the professional man forbid revealing any information disclosed to him in confidence.

Chemistry, continued Dr. Snell, conforms to all of these criteria except that of certification, or licensing. In some form, licensing of chemists appears inevitable, and chemists prefer permissive licensing like that of accountants (CPA) rather than the compulsory variety to which engineers are subject. Any tendency toward standardized salary scales is antithetical to the professional point of view, which emphasizes the differences inherent between individuals and does not try to standardize professional people.

Niagara

Chairman, F. L. R. Sievenpiper

Vice-chairman, Wallace M. Hazel

Secretary-treas., Oliver M. Morgan

64 Northledge Drive
Snyder 21, N. Y.

Chapter Rep., James Ogilvie

The Niagara Chapter met on February fifth to consider the proposed coalition and to discuss the material which the Louisiana Chapter had prepared concerning the matter. The Niagara Chapter commended the Louisiana group for their thoroughgoing study of the subject, and expressed agreement with the resolution made them by them, with some modifications, chiefly concerning practical working methods after the coalition should take place. Copies of the Niagara Chapter's discussions were sent to the chairman of the other INSTITUTE Chapters and to the National Council.

For Your Library

HANDBOOK OF CHEMISTRY. Sixth edition. N.A. Lange, Compiler and Editor. *Handbook Publishers, Inc.* 2082 pp. 5" x 8". Fabricoid. $7.00.

The reviewer has always recommended the *Handbook of Chemistry* on account of its particularly clear type. In the present edition, recognition has come at last that the size of a handbook should bear a measurable relation to the size of the human hand, and two tables of purely engineering data, which are available in other sources, particularly Perry's *Chemical Engineers' Handbook*, have been omitted, while three new tables of chemical and physicochemical data have been included.

The table of physical constants of inorganic compounds has been completely revised, following the plan of the similar table for organic compounds. Every compound has been listed with a serial number, and compounds, which on account of differences in nomenclature do not appear in one place, are listed in footnotes with the proper serial number attached. This table now is more complete than any similar table appearing in any other handbook and requires only a reference to Gmelin-Kraut for each compound, similar to the Beilstein references given in the table of organic compounds. This would be particularly desirable on account of the somewhat difficult indexing system in Gmelin-Kraut. However, it is recognized that to supply it would be a job of large magnitude.

On the whole, the reviewer finds the *Handbook* more useful than any similar one and believes that it should be within arms' reach of every working chemist.

—*Karl M. Herstein, F.A.I.C.*

THE ELECTRONIC THEORY OF ACIDS AND BASES. By W. F. Luder and Saverio Zuffanti. *John Wiley & Sons,* 1946. 165 pp. $3.00.

Much of the material in this book has previously been published in *Chemical Reviews* and in other leading journals. Gilbert N. Lewis, who was so widely-known for his funda-

mental theory of the sharing of electron pairs, read the manuscript and made suggestions. The presentation is simple and clear and the use of mathematical language has been held to a minimum.

The electronic theory which was proposed by Lewis in 1923 is very general. "An acid is capable of accepting a share in a lone electron pair from a base to form a coordinate covalent bond. A base donates a share in a lone electron pair to the acid." This definition succeeds in covering all the substances which have been classified as acids or bases under the other four competing theories. The results may be somewhat startling to the average chemist. For instance, acetone is classified as a strong base, and the "inert" gas argon is capable of neutralizing the strong acid boron fluoride to form compounds.

The theory has been firmly based on the following experimental criteria: (1) Neutralization, (2) Titration with indicators, (3) Displacement and (4) Catalysis. All four of these characteristics must be displayed by a particular substance for classification as an acid or a base.

Convincing evidence is given that the octet theory which appears in practically all elementary textbooks does not hold. Boron trichloride has six valence electrons. Beryllium chloride has only four. Many cases are given of compounds with more than eight valence electrons. Iodine heptafluoride has fourteen and osmium octafluoride must have sixteen. The rule of two, taken from the modern theory of atomic orbitals is offered as a replacement for the discredited rule of eight.

The book is of interest to all classes of chemists. For organic chemists there is a good deal of interesting material on the mechanism of aromatic substitution, free radical reactions, catalysis by acids and bases, alkylations, acylations and reactions of carbonyl compounds.

—*Homer van B. Joy, F.A.I.C.*

TEXTBOOK OF PHYSICAL CHEMISTRY. By Samuel Glasstone. Second edition. *D. Van Nostrand Company*. 1946. 1320—xiii pp. $12.00.

This comprehensive work explains those fundamentals which are common to both physics and chemistry, from Faraday to such contemporaries as Schroedinger, Heisenberg, and Dirac. The style is intelligible and clear. The index, the close of each chapter, and the text contain separate bibliographies which added together make one of the most complete directories in existence of the founders of and contributors to physical chemistry. This book adequately bridges the gap between physics and chemistry, and it should be an early "must" for those who are going to make chemistry their life-work.

—*E.E. Butterfield, F.A.I.C.*

MANUAL OF SPOT TESTS. By Fritz Feigl. *Academic Press.* 276 pp. 9¼" x 6¼". $3.90.

QUALITATIVE ANALYSIS BY SPOT TESTS. By Fritz Feigl. *Elsevier Publishing Company.* 574 pp. 9¼" x 6¼". $8.00.

Both publications are translated by Ralph E. Oesper.

The manual is in the philosophic approach and the "Qualitative Analyses" is quite specifically a procedural book. Each supplements the other to give a wide review of tests.

The Chemistry of the Carbon Compounds. Vol. III, Aromatic Compounds. Translated by E. J. Mee of Glasgow, Scotland. *Elsevier Publishing Company.* 1946. 795 pp. 5¾" x 8¼". $15.00.

This is a revised edition of Richter, up to 1939. It, like the Bible, has been repeatedly edited and revised, so that the errors are very few, and the data are standard. This book is a necessary reference volume.

——*J. A. Steffens, F.A.I.C.*

Chemical Preview, covering new processes, materials, machinery, products, and applications, is issued bimonthly. Chemists, engineers, or executives will be placed on the mailing list, without charge, if company name, major products manufactured, and title are sent to the publication at 737 North Michigan Avenue, Chicago 11, Illinois.

Foster D. Snell, Inc. Moves to New York, N. Y.

The offices and laboratories of Foster D. Snell, Inc., have been transferred from 305 Washington Street, Brooklyn, New York, to 29 West 15th Street, New York, N. Y., where they occupy a ten-story building.

"Chemistry in 1795," which appeared in The Chemist for October 1946, was reprinted in *The Branched Chain,* publication of the Tennessee sections of The American Chemical Society.

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Chemical Condensates

Ed. F. Degering, F.A.I.C.

"When you economize on education," says Blanche Stewart, president of the classroom teacher group in Concord, North Carolina, "you are not merely affecting the income level of teachers, you are playing with destiny."

"The great solid conviction which science," said Charles W. Eliot before 1910, "within the past three centuries, has enabled thinking men and women to settle down on is that all discovered and systematized knowledge is as nothing compared with the undiscovered, and that a boundless universe of unimagined facts and forces inter-penetrates and encompasses what seems the universe to us."

Bread mold, which destroys 150 million loaves of bread annually, is completely destroyed by heating the baked bread electronically for five seconds, according to Dr. William H. Cathcart.

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Where one man fails in an experiment, another succeeds. What is unknown in one age is clarified in the next. The arts and sciences are not cast from a mold: They are shaped and polished little by little, here a dab and there a pat. What my powers cannot solve, I still persist in sounding and trying out. By kneading and working over the new material, turning and warming it, I make it more supple and easier to handle for the man who will take it up after me. And he will do as much for a third.

—*The Autobiography of Michel de Montaigne* (1533-1592)

Meeting Dates

A.I.C. Council Meetings

Meetings of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS are held on Tuesday, at six o'clock p.m. in The Chemists' Club, 52 East 41st Street, New York, N. Y. Dates for the current season are:

March 4, 1947

March 25, 1947

April 22, 1947

May (Annual Meeting)

June 17, 1947

MAR. 21st. New York Chapter, A.I.C., No. 2 Park Avenue, New York. Student Medals awarded. Panel Discussion: "Opportunities Open to Chemists Outside the Laboratory." Among the subjects to be covered are: "Teaching" by Joseph Muenzen, S. J., Fordham University; "Technical Service" by Dr. Donald Price, Oakite Products Company; "Commercial Development" by James Park, Enjay Corporation; "Publishing" by Francis Turner, Reinhold Publishing Corporation; "The Need for Technically Trained Men in Industrial Advertising," by Paul Slawter, Jr., The House of J. Hayden Twiss. Other subjects will include "Technical Coordination," "Library," "Sales," and "Patents."

APR. 3rd—Pennsylvania Chapter, A. I.C. Engineers' Club, 1317 Spruce Street, Philadelphia. Speaker, J. C. Geniesse or C.H. Van Hartesveldt, Research and Development Department, Atlantic Refining Company. "Petroleum Fuels and Lubricants."

MAY 2nd—Annual Meeting, the American Institute of Chemists. Hotel Commodore, New York, N. Y. Medal award to Dr. M. L. Crossley, F.A.I.C.

MAY 9th—New York Chapter, A.I.C. 26th Floor, No. 2 Park Avenue, New York, N. Y. Speaker to be announced.

JUNE—Pennsylvania Chapter, A.I. C. Outing. (To be announced).

The article, "Termination of Employment", which appeared in the August, 1946, issue of THE CHEMIST, was reprinted in the November *Bulletin* of the Virginia Sections of the American Chemical Society.

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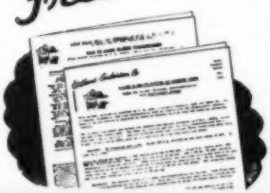

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